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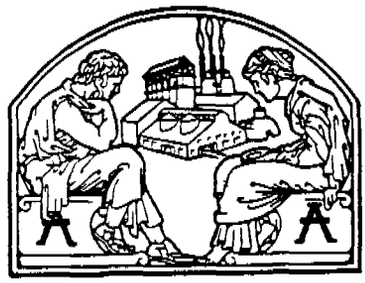
INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, Inc.

Chemical-Toxicological Series, Bulletin No. 7



THRESHOLD LIMIT VALUES

A report of progress in 1967 and Announcement of 1968 Workshop on Threshold Limit Values

4400 Fifth Avenue
Pittsburgh, Pennsylvania
1967

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Introduction

A Workshop on Threshold Limit Values sponsored by the Industrial Hygiene Foundation (IHF) Chemical-Toxicological Committee will be held February 1-2, 1968 at the Kettering Laboratory, University of Cincinnati, Cincinnati, Ohio. The purpose of the Workshop is:

1. To further liaison between industry and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limits Committee in setting and validating threshold limit values,
2. To include industrial experience by means of IHF's Central Data Repository Project,[1] and
3. To further progress in development of the National Environmental and Occupational Health Information Center Program described at IHF's 32nd Annual Meeting.[2,3]

The Workshop will open at 2:00 p.m., Thursday, February 1, with an orientation lecture and discussion for attendees desiring background information such as history, modus operandi, criteria for setting, current status, etc.; in general, a short course on TLV's. A social gathering will be held at 8:30 p.m. providing an opportunity for informal discussions among attendees.

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1. "Improving the Communication of Industrial Data Concerning Threshold Limit Values," by Emil A. Pfitzer, Sc.D., Transactions of 31st Annual Meeting of Industrial Hygiene Foundation, 1966.
2. "A National Industrial Hygiene Information Program," by Allen Kent, presented at 32nd Annual Meeting of Industrial Hygiene Foundation, October 10-11, 1967.
3. "Developing Technical Information and Resources in Environmental and Occupational Health," by Edward P. Radford, Jr., M.D., presented at 32nd Annual Meeting of Industrial Hygiene Foundation, October 10-11, 1967.

The morning sessions of the second day will concentrate on documentation of TLV changes and additions: (1) presentation by Dr. Herbert E. Stokinger, Chairman of the ACGIH Threshold Limits Committee, (2) specific critiques on individual chemicals; (3) attempt to make a significant contribution of pertinent information to the Threshold Limits Committee.

The afternoon sessions will be limited to one specific area—such as legal aspects, principles and procedures for developing industrial data, etc. — possibly using a panel to augment the discussion.

Official representatives from relevant committees of the Industrial Medical Association, Manufacturing Chemists Association, and United States of America Standards Institute will be invited to report on their activities regarding TLV's during the final session. A summary of major recommendations and related activities originating from the two-day conference will close the Workshop Friday, February 2, ending at 5:00 p. m.

Information contained in this Bulletin is intended to provide useful background for all persons concerned with the setting and validating of TLV's. It is hoped that IHF may continue to provide a common meeting ground for representatives from industry, government, universities and private institutions to discuss freely and openly problems of mutual interest for the benefit of all.

Attendance at the Workshop on Threshold Limit Values is not restricted. An invitation is hereby extended to all interested persons to attend; a registration blank may be found in the appendix, page 15. The IHF Chemical-Toxicological Questionnaire which also appears in the appendix, page 11, should be completed and returned by all who expect to participate in the Workshop to assist in proper allocation of time, if this has not already been done. (Questionnaire was attached to IHF Third Quarterly Report.)

Report on the 1967 IHF Workshop on Threshold Limit Values

The 1967 IHF Workshop on Threshold Limit Values, held February 1-2, 1967 at Mellon Institute, Pittsburgh, Pa., was attended by approximately 40 representatives of industry, universities, government and others concerned with the setting, use and validation of TLV's. It was evident at this meeting that various committees of professional societies and industrial associations have been significantly contributing to planning and action regarding TLV's. The unique features of the IHF Workshop on Threshold Limit Values are:

1. An early opportunity to examine and discuss the basis for current TLV revisions and additions with the chairman of the TLV Committee; the opportunity to meet with other professionals who might have similar problems or questions about specific TLV's,
2. A completely open forum to discuss and to define problems of the use of TLV's,
3. A continuing opportunity for dialogue to maintain impetus towards improved communication and definitions of goals and action projects; and
4. The facilities and staff of IHF to activate proposals and recommendations of the Workshop.

Indications of Significant Progress

The following items are not presented as credits for the IHF Workshops on Threshold Limit Values, as other groups and individuals have worked with the Threshold Limits Committee to develop specifically some of the items.

However, the factors involved in the items below have been discussed at the IHF Workshops.

1. Early Availability of the Notice of Intended Changes.

The 1967 Notice of Intended Changes was made available in late November of 1966. In previous years, the Notice had not been available until early January. This allowed an additional full month for consideration of the changes by parties outside the Threshold Limits Committee. IHF sends this Notice to its members shortly after receipt.

2. Early Availability of Documentation.

Written documentations for chemicals on the 1967 Notice of Intended Changes were available on about one-half of the chemicals by mid-January, 1967, and on essentially all of the chemicals by the time of the IHF Workshop on February 1-2. Copies of these written documentations were made available to all attendees at the Workshop. This represented a marked improvement in the general availability of documentation. This is a major effort for the Threshold Limits Committee and is an area where IHF members can make significant further contributions. Several of the documentations were particularly limited and required input from industrial and other sources.

3. Recognition of IHF Role for Data Transferal.

The Threshold Limits Committee approved the willingness of IHF to serve as the transfer agent for data to be submitted to the Threshold Limits Committee, but retaining the anonymity of the original

contributor. In fact the 1967 Notice of Intent gave name and address for Dr. deTreville and IHF for those who might prefer to submit data in this manner. In 1967 (to date) there have been no users of this mechanism; however, the pathway remains available for those who wish to use it.

4. Responses to the Notice of Intent.

It is not possible to give case histories of specific contributions from the IHF Workshop on Threshold Limit Values which led exclusively to decisions on TLV changes. However, there was general discussion and individual contributions on many of the chemicals and their proposed TLV's. The exchange of experiences and information relative to these chemicals is a unique opportunity at the IHF Workshop and IHF members can make invaluable contributions in this manner.

5. Elimination of the Tentative TLV List.

The list of Tentative Values of TLV's was of concern because it tended to take on almost permanent status by its use in codes, etc. This list is now clearly labelled as "Notice of Intended Changes." TLV's which were previously on the "Recommended Limits" remain in effect and remain listed with reference to the "Intended Values."

6. Legal Aspects of the Use of TLV's.

The IHF Workshop provided an open and useful exchange of ideas regarding legal aspects of TLV's in codes and regulations.

as well as legal liability relative to information and records. In particular, it was pointed out that the mixing of TLV's into one list, when the bases for the list are markedly varied, results in a general weakening of the total list. This fact was thought to contribute to much of the problems surrounding the use of TLV's in legal codes.

7. Format for Information Input.

The kinds of information and the manner of its presentation was discussed relative to environmental and clinical data which are required for validation of TLV's. Several examples of a format for this information were presented and discussed. In particular, the potential role of IHF was noted for purposes of supplying equipment for collection of data as well as consultation on the format for presentation and the interpretation of the data.

Emil A. Pfitzer, Sc.D.
Secretary
IHF Chemical-Toxicological Committee

COMMITTEE ON THRESHOLD LIMITS
of the
American Conference of Governmental Industrial Hygienists

1968 NOTICE OF INTENT[4]

This Notice of Intent is published so that industry-connected individuals principally, but others also, may have an opportunity to help shape the deliberations of the Committee prior to its recommendations of tentative changes in the 1967 Threshold Limits List. This can be done by submitting to the Chairman comments on the intended changes, with supporting data, or by submitting new data on substances not within the Notice of Intent.

This Notice is not binding on the Committee to place all substances listed below in the 1968 Edition, nor does it restrict the Committee to these substances; substances with appropriate supporting data received following the publication of this list will be considered at the next Committee meeting for inclusion in the 1968 Edition. This Notice indicates only those substances that are under consideration by the Committee. Documentation is available upon request for those substances bearing a threshold limit value.

All comments should reach the Chairman by March 15, 1968. Address: Dr. Herbert E. Stokinger, U.S. Public Health Service, 1014 Broadway, Cincinnati, Ohio 45202. If preferred, information may be sent to the Repository of Anonymous Occupational Health Data, c/o Dr. R. T. P. deTreville, Industrial Hygiene Foundation, 4400 Fifth Avenue, Pittsburgh, Pennsylvania 15213.

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4. Reproduced verbatim with permission from the Chairman of the American Conference of Governmental Industrial Hygienists Threshold Limits Committee, Dr. Herbert E. Stokinger.

The following list of Proposed Revisions and Additions for the 1968 Threshold Limits List has resulted from the fall meeting of the Plenary Committee:

REVISIONS UNDER CONSIDERATION

SUBSTANCE	FROM 1967 LIST ppm, mg/m³ or mppcf	PROPOSED FOR 1968 LIST ppm, mg/m³ or mppcf
Asbestos*	5	*Appendix 7. A limit of 5 mppcf, based on impinger samples counted by light-field technics, is satisfactory to control exposures to most forms of asbestos. Crocidolite, however, has been shown to produce, in addition to the asbestotic inflammation, also mesothelioma. Since no safe limit can be established for this form of asbestos at this time, until more definitive data are obtained, it is recommended that workers exposed to crocidolite be equipped with air-supplied helmets.
Benzene	C 25	10
Butyl mercaptan	10	0.5
Cristobalite* Tridymite*	250 mppcf % SiO_2 + 5	*Downward revision by a facto of 2.5?
Ethyl mercaptan	10	0.5
Heptane	200	500
Methyl mercaptan	10	0.5
Oil Mists	5	5* If vapors involved, apply appropriate TLV
Pentane	1000	500

REVISIONS (Continued)

SUBSTANCE	FROM 1967 LIST ppm, mg/m³ or mppcf	PROPOSED FOR 1968 LIST ppm, mg/m³ or mppcf
Quartz	$\frac{250 \text{ mppcf}}{\% SiO_2 + 5}$	$\frac{10 \text{ mg/m}^3}{\% \text{ Resp. free } SiO_2^* + 2}$ (alternative mass formula).

*Respirable free SiO_2 as defined by:

Areodynamic Diameter (unit density sphere) micra	Minimal % Collected
2.	90
2.5	75
3.5	50
5.0	25
10.	0

Stoddard solvent	500	200
Tetraethyl lead	0.075	Downward revision
Tetramethyl lead	0.075	" "

ADDITIONS UNDER CONSIDERATION

SUBSTANCE	PROPOSED LIMIT
Dichloroacetylene	C 0.1 ppm
Endosulfan (thiodan)-skin	0.1 mg/m³
Indene	10 ppm
Methyl isoamyl alcohol	100 ppm
Pentaerythritol	15 mg/m³
Rosin fumes	0.2 mg/m³
Trimethylbenzene	----------

DESIRABLE SUBSTANCES FOR ADDITION, BUT FOR WHICH INADEQUATE DATA EXIST

Information pertinent to the recommendation of an industrial air limit is solicited on the following substances:

Aluminum powder
Benzothiazyl disulfide
Butyl lactate
o-Chlorostyrene
Hexafluoroacetone
Hexafluoroisopropanol
Mercaptobenzothiazole
(Poly)vinyl chloride
Silicon tetrachloride
Silicon tetrafluoride
Vinyl acetate

Dr. H. E. Stokinger, Chairman, TLV Committee

November 22, 1967.

COMPLETE and RETURN TO

INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, INC

MELLON INSTITUTE, 4400 FIFTH AVENUE

PITTSBURGH, PA 15213

CHEMICAL-TOXICOLOGICAL QUESTIONNAIRE

☐ No
☐ Yes

1. IHF is developing data on human experience with known concentrations of environmental contaminants, along lines suggested by Dr. Emil A. Pfitzer, Chief of Toxicology, The Kettering Laboratory, at the Foundation's 31st Annual Meeting. Is your organization willing to cooperate in a Central Data Repository Program[a] to be conducted by IHF in association with the American Conference of Governmental Industrial Hygienists, American Industrial Hygiene Association, and other professional and technological agencies now actively engaged in setting hazard and pollution control standards?

☐ No
☐ Yes

2. Do you have clinical and/or experimental toxicological data on the following compounds and are you willing to provide information and to assist in preparation and coordination of the Foundation's recommendations on them? If yes, please check specific compounds.

___ 2-Acetylaminofluorene
___ 4-Aminodiphenyl
___ Benzidine and its salts
___ Dichlorobenzidine
___ 4-Dimethylaminoazobenzene
___ beta-Naphthylamine
___ 4-Nitrodiphenyl
___ n-Nitrosodimethlamine
___ beta-Propiolactone

New Compounds for the AIHA Hygenic Guide Program 1967-1968:

___ Ethanolamines
___ Tetramethyl Lead
___ o-Tolidine & Benzidine
___ Sodium & Potassium Hydroxides
___ Phosphorus Trichloride
___ Triphenyl Phosphate
___ Pentaerythritol
___ Formic Acid
___ Ethyl Butyl Ketone
___ Pentachlorophenol & Sodium Penta.
___ Maleic Anhydride
___ Benzene Hexachloride
___ Propylene Imine
___ Diglycidyl Ether
___ Mestronal
___ Stoddard Solvent
___ 2-Hexanone
___ Mesityl Oxide
___ Methyl CSV Acetate
___ Ammonium Nitrate
___ Ammonium Sulfate
___ Crotonaldehyde
___ Silane
___ Rare Earths
___ Sulfur
___ Vinyl Acetate
___ Chlorine
___ Chloroprene
___ Plutonium
___ Osmium
___ Uranium
___ Ethyl Silicate
___ Cyclohexanol

(a) This IHF Central Data Repository Project is not to be confused with another IHF Biostatistical Study on Mortality and Morbidity, also under way.

Industrial Hygiene Foundation of America, Inc.

Chemical-Toxicological Questionnaire

ACGIH Threshold Limit Committee — Threshold Limit Values for 1967[b]

NOTICE OF INTENDED CHANGES

These substances, with their corresponding values, comprise those for which either a limit has been proposed for the first time, or for which a change in the "Recommended" listing has been proposed. In both cases, the proposed limits should be considered trial limits that will remain in this listing for a period of at least two years. During this time, the previously Recommended Limit will remain in effect. If, after two years no evidence comes to light that questions the appropriateness of the values herein, the values will be placed in the "Recommended" list. Documentation is available for each of these substances.

	Substance	ppm*	Mg M³**
↔	Abate	–	15
↔	Boron tribromide	1.0	–
↔	Bromine pentafluoride	0.1	–
	sec-Butyl alcohol	150	450
+	Camphor	2	–
+	Chlorine	1	–
	ω-Chloroacetophenone (phenacylchloride)	0.05	0.3
	Chromium, sol. chromic, chromous salts, as Cr	–	0.5
	Metallic & insol. salts	–	1.
	Cobalt, Metal fume & dust	–	0.1
↔	Cyanogen	10	–
	Dibutyl phosphate	1	5.
	Dibutylphthalate	–	5.
↔C	Diethylene triamine-Skin	10	–
	Diisopropylamine-Skin	5.	20
	Dimethylphthalate	–	5.
	Diphenyl	0.2	1
↔	Diphenyl amine	–	10
↔C	Ethyleneglycol dinitrate and or Nitroglycerin-skin	0.2*	–
	Fibrous glass	–	5.
	Gasoline	AM	
+	Heptane	200	800
	Hexachloronaphthalene-Skin	–	0.2
↔	Indium and compounds, as In	–	0.1
↔	Iron salts, soluble as Fe	–	1
	Isobutyl alcohol	100	300
	Maleic anhydride	0.25	1
↔C	Methyl silicate	5	–
	Naphtha (coal tar)	100	400.
	Nitric oxide	25.	30
	Octachloronaphthalene-Skin	–	0.1
+	Octane	200	930
	Paraquat-Skin	–	0.5
	Phenyl glycidyl ether (PGE)	10	62.
↔	Propargyl alcohol-Skin	1	–
	Propyl alcohol	200	510
↔	RDX-Skin	–	1.5
	Ronnel	–	15.
+	Stoddard solvent	200	–
+	Styrene	50	–
C	Terphenyls	1	9.4
	Tetrachloronaphthalene-Skin	–	2
	Tributyl phosphate	–	5.
↔	Tungsten & compounds, as W		
	Soluble	–	1
	Insoluble		5
+	Uranium, sol. & insol. compounds as U	–	0.2
	Zinc chloride (fume)	–	1

* Parts of vapor or gas per million parts of air plus vapor by volume at 25°C and 760 mm. Hg pressure.

** Approximate milligrams of particulate per cubic meter of air.

*** An atmospheric concentration of not more than 0.02 ppm, or personal protection may be necessary to avoid headache.

+1967 Revision ++1967 Additions

(b.) The entire list of Recommended Values and Intended Changes were reprinted with permission from the American Conference of Governmental Industrial Hygienists in the *Industrial Hygiene Digest* 31:i-ix, September 1967. The preamble to the TLV's is essential to their proper understanding and application.

☐ Yes ☐ No 3. Can you supply data on other compounds of possible IHF interest for the setting (or validation) of threshold limits and/or preparation of Hygienic Guides? If yes, please list in the following spaces. A list of Hygienic Guides is appended for your reference.

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

☐ Yes ☐ No 4. Will you plan to attend or be represented at a Third IHF Chemical-Toxicological TLV Workshop early in 1968 in Pittsburgh, Pa., if one is scheduled?

_____
(name)

_____
(title)

_____
(company name)

_____
(date)

APPENDIX

HYGIENIC GUIDES:*

Subject	Date Published
Acetaldehyde	Sept 1955
Acetone	Mar 1957
Acetonitrile	June 1960
Acetylene	Apr. 1967
Acrolein	June 1963
Acrylonitrile	Mar 1957
Allyl Alcohol	Dec 1963
Allyl Chloride	Dec 1963
Allyl Glycidyl Ether	Feb 1965
Aluminum & Aluminum Oxide	June 1963
Amyl Acetate	Rev. April 1965
Anhydrous Ammonia	Sept 1956
Aniline	Dec 1955
Antimony & Its Compounds	Dec 1959
Arsenic & Its Compounds	Rev. Dec. 1964
Arsine	Rev Aug 1965
Asbestos	April 1958
Barium & Its Inorganic Cmpds.	Dec. 1962
Benzene (Benzol)	Rev. Dec 1961
Beryllium & Its Cmpds	Rev Dec. 1964
Bisphenol A	June 1967
Bromine	Aug 1958
Bromochloromethane	Dec 1961
1,3-Butadiene	Feb 1963
Butyl Alcohol	Sept 1955
n-Butyl Acetate	Dec 1962
n-Butylamine	Dec 1960
Cadmium	Rev Dec. 1962
Carbon Dioxide	Oct 1964
Carbon Disulfide	Dec 1956
Carbon Monoxide	Rev. Aug 1965
Carbon Tetrachloride	Rev Dec. 1961
Chlorine Dioxide	June 1958
Chlorobenzene	Feb 1964
Chlorodiphenyls	Feb 1965
Chloroform	Dec 1965
Chloronaphthalenes	Feb 1966
Chromic Acid	June 1956
Cobalt	Apr 1966
Cumene	Dec 1961
Cyclohexane	Oct. 1963
Cyclohexanone	Dec 1965
DDT	Oct 1959
Diborane	Oct 1958
O-Dichlorobenzene	June 1964
P-Dichlorobenzene	June 1961
1,2-Dichloroethane (Ethyl Dichloride)	Rev. Aug 1965
Dichloromethane (Methyl Dichloride)	Rev Dec 1965
Diethylamine	June 1960
Diethylene Triamine	June 1960
Diisobutyl Ketone	Dec 1962
Dimethylformamide	Sept 1957
1,1-Dimethylhydrazine	April 1963
2,4-Dinitrophenol	Feb 1958
Dioxane	Dec 1960
Diphenyl	Oct 1964
Epichlorohydrin	Dec 1961
Epoxy Resin Systems	Oct. 1958
Ethyl Acetate	April 1964
Ethyl Acrylate	Dec 1966
Ethyl Alcohol	Mar 1956
Ethyl Benzene	Dec 1957
Ethyl Bromide	Apr. 1965
Ethyl Chloride	Oct. 1963
Ethyl Ether	Feb. 1966
Ethylenediamine	Dec 1959
Ethylene Chlorohydrin	Dec. 1961
Ethylene Dibromide	Apr. 1958
Ethylenimine	Feb 1965
Ethylene Glycol Dinitrate	Dec 1966
Ethyl Glycol Mono-n-Butyl Ether	Oct 1958
Ethyl Glycol Monoethyl Ether	June 1963
Ethyl Glycol Monoethyl Ether Acetate	Dec. 1965
Ethyl. Glycol Mono-methyl Ether	June 1957
Ethylene Oxide	Dec. 1958
Fluoride Bearing Dusts & Fumes	Rev. Aug. 1965
Fluorine	Rev. Dec 1965
Formaldehyde (Methanal)	Rev. Apr 1963
Furfural	April 1965
Heptane	Feb 1959
Hexane	Feb 1959
Hydrazine	Dec 1956
Hydrogen Chloride	Aug 1958
Hydrogen Fluoride	Mar. 1956
Hydrogen Peroxide	Sept. 1957
Hydrogen Selenide	Dec 1959
Hydrogen Sulfide	Rev Feb 1963
Hydroquinone (1,4 Benz)	Apr 1963
Iodine	Aug. 1965
Lead & Its Inorganic Cmpds	Apr 1958
Lithium Hydride	Aug 1964
Magnesium	Feb 1960
Manganese & Its Inorg Cmpds	June 1963
Mercury	Rev June 1966
Meta-Dinitrobenzene	Feb 1959
Metal Hydrides	Feb 1960
Methyl Acetate	June 1964
Methyl Alcohol	Dec 1957
Methyl Bromide	Apr 1958
Methyl Chloride	Dec 1961
Methyl Ethyl Ketone	Mar. 1957
Methyl Isobutyl Ketone	Apr 1966
Molybdenum	Feb 1960
Nickel	Apr 1966
Nitric Acid	Aug. 1964
Nitrobenezene	Feb 1959
Nitroethane	Dec 1963
Nitrogen Dioxide	June 1956
Nitroglycerine	Feb 1960
Nitromethane	Dec 1961
Nitropropane	June 1960
Oxygen Difluoride	April 1967
Ozone	Rev April 1966
Parathion	Oct. 1959
Pentaborane-9	Rev June 1966
Pentachlorophenol & Sodium Pent.	Sept. 1957
Pentane	Apr 1966
Petroleum Naphtha	Aug 1963
Phenol	Dec 1957
Phosgene	Dec. 1960
Phosphine	June 1964
Phosphoric Acid	June 1957
Phosphoric Anhydride	June 1958
Polonium 210	June 1959
Propanol	Dec 1961
Propylene Dichloride	June 1967
Propylene Oxide	June 1959
Pyridine	Rev Aug. 1963
Quinone (p-Benzoquinone)	Apr 1963
Radon & Its Daughters	June 1959
Selenium & Compounds	June 1959
Silica (Amorphous)	Apr 1958
Silica (Free)	Sept 1957
Sodium Chlorate	Feb 1958
Stibine	Dec 1960
Styrene Monomer	Dec 1959
Sulfur Dioxide	Dec 1955
Sulfuric Acid	Sept 1957
Teflon, Fluoro Resins, etc	Rev Apr 1963
Tellurium	Apr 1964
Tetrachloroethylene	Rev Dec 1965
Tetraethyllead	Aug 1963
Tetrahydrofuran	June 1959
Tetranitromethane	Oct 1964
Thorium & Its Compounds	Oct 1959
Titanium	June 1959
Titanium Dioxide	Apr 1966
Toluene (Toluol, Methyl Benz)	June 1957
Toluene Diisocyanate	Rev Feb 1967
1,1,1—Trichloroethane (Methyl Chloroform)	Rev Dec 1961
Trichloroethylene	Rev Feb 1964
2,4,6-Trinitrotoluene	Oct 1964
Triorthocresylphosphate	Oct 1963
Turpentine	June 1967
Uranium (Natural)	Apr 1958
Vanadium Pentoxide	June 1957
Vinyl Chloride	Aug 1964
Zylene (Xylol, di-methyl Benz)	June 1957
Zirconium	Oct 1958
Acetic Acid	March 1957
Hydrogen Cyanide	Sept 1956
Nickel Carbonyl	Dec 1956
Zinc Oxide	Sept 1956

* Reproduced from American Industrial Hygiene Association Journal.

Please detach and return by JANUARY 19, 1968, to Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Pennsylvania 15213

Registration for:

IHF WORKSHOP ON THRESHOLD LIMIT VALUES

I plan to attend the IHF Workshop on TLVs at The Kettering Laboratory, University of Cincinnati, Eden & Bethesda Avenues, Cincinnati, Ohio as follows:

☐ Yes ☐ No I will attend the orientation sessions, Thursday, February 1.

☐ Yes ☐ No I will attend the social and informal discussion gathering, Thursday evening, February 1, 8:30 pm.

☐ Yes ☐ No I will attend the workshop and luncheon, Friday, February 2.

Enclosed is a check for $25 which includes attendance at the social hour, workshop, and luncheon February 2, 1968.* Make registration fee checks payable to: Industrial Hygiene Foundation.

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip Code_____

*Hotel accommodations to be paid by participant directly.

General Information

WORKSHOP ON THRESHOLD LIMIT VALUES

[redacted]

ISTRATION: Detach and return registration form, along with fee, by January 19, 1968.

CE: The Kettering Laboratory
University of Cincinnati
Eden & Bethesda Avenues
Cincinnati, Ohio

: $25—Includes attendance at the social hour, Workshop, and luncheon.

POSE: For the third year, the IHF Chemical-Toxicological Committee is sponsoring a meeting of professional personnel concerned with setting, use and validation of threshold limit values (TLVs). A continued dialogue is planned to maintain impetus already developed within IHF in areas of:

1. Clearer definitions of problems of use of TLVs.
2. Improved communications in validation of TLVs.
3. Documentation of current TLV changes.

[redacted]

[redacted]

[redacted]

TABLE I

TOXIC CONCENTRATIONS OF VARIOUS GASES, DUSTS, FUMES, AND METALS IN THE ATMOSPHERE

(I.C.I. Industrial Products and Health Research Committee)

No.	Gas	(1) Concentrations Causing Severe Toxic Effects in Persons Exposed for the Stated Times			(2) Concentrations which, if Exposure Continues for more than a Short Time, may Lead to Symptoms of Illness		(3) *Concentrations in General Atmosphere of Plant Greater than those below Indicate Unsatisfactory Conditions*	
		(p.p.m. v./v)	(mg./cu.* metre 20°C.)	Time of Exposure (Min.)	(p.p.m. v./v)	(mg./cu.* metre 20°C.)	(p.p.m. v./v)	(mg./cu.* metre 20°C.)
1	Acetaldehyde	1,000	1,830	60	500	915	*200*	*366*
2	Acetic acid	200	500	60	40	100	*20*	*50*
3	Acetone	4,000	9,650	60	800	1,930	*400*	*965*
4	Acetone cyanohydrin	40	140	1	20	70	*10*	*35*
5	Acetonyl acetone	300	1,424	60	150	712	*75*	*356*
6	Acetophenone	80	400	60	40	200	*20*	*100*
7	Acetyl chloride	10	33	1	2	6·6	*1*	*3·3*
8	Acrolein	20	46	1	8	18·6	*5*	*11·6*
9	Acrylonitrile	100	220	1	50	110	*20*	*44*
10	Allyl alcohol	40	96	1	20	48	*5*	*12*
11	Allyl chloride	200	636	60	100	318	*50*	*159*
12	Ammonia	500	355	1	200	142	*100*	*71*
13	*Iso* Amyl acetate	1,000	5,410	60	300	1,623	*100*	*541*
14	*Iso* Amyl alcohol	400	1,464	60	200	732	*100*	*366*
15	Aniline	80	312	60	20	78	*10*	*39*
16	Arcton 6 (Freon 12) (Difluorodichloromethane)	50,000	251,700	60	20,000	100,680	*10,000*	*50,340*
17	Arsine	10	32	1	1	3·2	*0·5*	*1·6*
18	Benzene (Benzol)	1,500	4,800	60	500	1,600	*50*	*160*
19	Benzine (as Hexane)	3,000	10,728	60	1,000	3,576	*250*	*894*
20	Benzyl acetate	100	616	60	50	313	*15*	*94*
21	Benzyl chloride	20	100	1	10	50	*5*	*25*
22	Bromine	3	20	1	1	6·6	*0·5*	*3·3*
23	Butadiene	8,000	17,968	60	5,000	11,230	*2,500*	*5,615*
24	*n*-Butanol (Butyl alcohol)	1,000	3,080	60	100	308	*50*	*154*
—	2-Butanone (Methyl ethyl ketone)	See No. 90 Methyl ethyl ketone						
25	*n*-Butyl acetate	2,000	9,650	60	500	2,412	*200*	*965*
26	*n*-Butyl methacrylate	800	4,724	60	400	2,362	*200*	*1,181*
27	Carbon dioxide	30,000	54,930	60	10,000	18,310	*5,000*	*9,155*
28	Carbon disulphide	500	1,600	60	150	480	*10*	*32*
29	Carbon monoxide	400	464	60	100	116	*50*	*58*
30	Carbon tetrachloride	2,000	12,800	60	500	3,200	*50*	*320*
31	*p*-Chloraniline	8	44	1	4	22	*2*	*11*
32	(*mono*) Chlorobenzene	400	1,872	60	200	936	*75*	*351*
33	2-Chlorobutadiene	100	368	1	50	184	*25*	*92*
34	Chlorine	10	29	1	4	12	*1*	*2·9*
35	*p*-Chloronitrobenzene	10	66	1	4	26	*1*	*6·6*
36	Chloroform	2,000	9,960	60	500	2,490	*50*	*249*
37	(*o* & *p*) (*mono*) Chlorotoluene	400	2,106	60	200	1,053	*75*	*395*
38	Cyanogen chloride	5	13	1	2	5·2	*0·5*	*1·3*
39	Cyclohexane	2,000	6,990	60	800	2,796	*400*	*1,398*
40	Cyclohexanol	1,000	4,160	60	400	1,664	*100*	*416*
41	Cyclohexanone	1,000	4,080	60	200	816	*75*	*306*
42	Cyclohexylamine	100	410	1	40	164	*20*	*82*
43	*o*-Dichlorobenzene	300	1,836	60	100	612	*25*	*153*
44	ββ'Dichlorodiethyl ether	100	593	1	30	178	*15*	*89*
45	(*cis* & *trans*) Dichloroethylene	2,000	8,072	60	1,000	4,036	*500*	*2,018*
46	Dicyclohexylamine	50	388	60	40	302	*20*	*151*
47	Diethyl carbonate	800	3,928	60	400	1,964	*200*	*982*
48	Di-isobutylene	4,000	18,640	60	2,000	9,320	*1,000*	*4,660*
49	Di-isobutyl ketone	400	1,896	60	200	948	*100*	*474*
50	Dimethyl dioxane	500	2,412	60	300	1,447	*200*	*965*
51	Dimethyl sulphate	15	78	1	10	52	*5*	*26*
52	Dioxane	500	1,830	60	300	1,098	*200*	*732*
53	Ethanol (Ethyl alcohol)	8,000	15,312	60	2,000	3,828	*1,000*	*1,914*
54	Ether (diEthyl)	8,000	24,624	60	2,000	6,156	*500*	*1,539*
55	β-Ethoxyethyl methacrylate	500	3,285	60	200	1,314	*100*	*657*
56	Ethyl acetate	2,000	7,320	60	800	2,928	*400*	*1,464*
57	Ethyl acetoacetate	200	1,080	60	100	540	*50*	*270*
58	Ethyl benzoate	200	1,248	60	100	624	*50*	*312*
59	Ethyl bromide	250	1,135	60	100	454	*50*	*227*
60	Ethyl chloride	10,000	26,830	60	5,000	13,415	*2,000*	*5,366*
61	Ethylene chlorhydrin	20	68	60	10	34	*2*	*7*
62	Ethylene dichloride	500	2,050	60	100	410	*50*	*205*
63	Ethylene glycol dinitrate	20	128	60	1	6·4	*0·5*	*3·2*
64	Ethylene oxide	250	450	60	100	180	*10*	*18*
65	Ethyl formate	1,000	3,080	60	400	1,232	*200*	*616*
66	*Ethylidene* dichloride	400	1,648	60	200	824	*50*	*206*
67	Ethyl silicate	400	3,464	60	200	1,732	*100*	*866*
68	Formaldehyde	100	120	1	30	36	*10*	*12*
—	Freon 12 (Arcton 6)	See No. 16 Arcton 6.						
69	Hydrazoic acid	10	18	60	4	7·2	*1*	*1·8*
70	Hydrogen chloride	50	75	1	20	30	*10*	*15*

71	Hydrogen cyanide	40	44	1	20	22	*10*	*11*
72	Hydrogen fluoride	40	34	1	10	8·5	*2*	*1·7*
73	Hydrogen selenide	2	6	1	0·5	1·5	*0·1*	*0·3*
74	Hydrogen sulphide	200	280	1	50	70	*20*	*28*
75	Iodine	0·5	5·5	1	0·2	2·2	*0·1*	*1·1*
76	Isophorone	40	228	60	20	114	*10*	*57*
77	Ketene	2	3·6	1	1	1·8	*0·5*	*0·9*
78	Lauryl mercaptan	20	168	1	10	84	*5*	*42*
79	Mesityl oxide	200	816	1	100	408	*50*	*204*
80	Methacrolein	10	29	1	5	15	*2*	*5·8*
81	Methacrylic acid	1,000	3,575	1	400	1,430	*200*	*715*
82	Methallyl alcohol	150	450	1	100	300	*50*	*150*
83	Methanol (Methyl alcohol)	2,000	2,560	60	500	640	*200*	*256*
84	Methyl acetate	500	1,540	60	200	616	*100*	*308*
85	Methyl acrylate	100	356	1	50	178	*25*	*89*
86	Methyl bromide	250	1,000	1	50	200	*20*	*80*
87	Methyl *iso*-butyl ketone	1,000	4,160	60	400	1,664	*200*	*832*
88	Methyl α-chloracrylate	4	20	1	2	10	*1*	*5*
89	Methyl chloride	1,500	3,150	60	500	1,050	*100*	*210*
90	Methyl ethyl ketone (2-Butanone)	2,000	5,990	60	500	1,498	*200*	*599*
91	Methyl iodide	40	236	1	20	118	*10*	*59*
92	Methyl cyclohexanone	300	1,400	60	150	700	*75*	*350*
93	Methylene chloride	2,000	7,072	60	1,000	3,536	*500*	*1,768*
94	Methyl formate	1,000	2,495	60	400	998	*200*	*499*
95	Methyl methacrylate	3,000	12,480	60	2,000	8,320	*1,000*	*4,160*
96	Naphtha distillate (as Cumene)	300	1,500	60	150	750	*50*	*250*
97	Nickel carbonyl	4	28	1	2	14	*1*	*7*
98	Nitrobenzene	200	1,020	60	40	204	*1*	*5·1*
99	Nitroethane	800	2,496	60	500	1,560	*200*	*624*
100	Nitrous fumes (as NO_2)	100	190	1	30	57	*10*	*19*
101	Nitroglycerine	20	189	60	1	9·4	*0·5*	*4·7*
102	Nitromethane	800	2,028	60	500	1,268	*200*	*507*
103	1-Nitropropane	400	1,480	60	200	740	*100*	*370*
104	2-Nitropropane	400	1,480	60	200	740	*100*	*370*
105	*o*-Nitrotoluene	200	1,140	60	40	228	*1*	*5·7*
106	Perchloroethylene (Tetrachloroethylene)	1,000	6,905	60	400	2,762	*200*	*1,381*
107	β-Propiolactone	100	300	1	20	60	*10*	*30*
108	*Iso*-Propyl alcohol	2,000	4,995	60	800	1,998	*400*	*999*
109	Phosgene	5	21	1	1	4·2	*0·5*	*2·1*
110	Phosphorus trichloride	2	12	1	1	5·8	*0·5*	*2·9*
111	Stibine	0·5	2·5	1	0·2	1	*0·1*	*0·5*
112	Styrene	1,000	4,330	60	200	866	*100*	*433*
113	Sulphur dioxide	200	520	1	20	52	*10*	*26*
114	Sulphur monochloride (S_2Cl_2)	20	112	1	10	56	*5*	*28*
115	Sulphuryl chloride	10	56	1	4	22	*1*	*5·6*
116	Tetrachlorethane	50	350	60	20	140	*10*	*70*
—	Tetrachloroethylene (Perchloroethylene)	See No. 106 Perchloroethylene.						
117	Thionyl chloride	20	100	1	·10	50	*5*	*25*
118	Thiophosphoryl trichloride	10	70	1	4	28	*1*	*7*
119	Trichloroethylene	2,000	10,940	60	800	4,376	*400*	*2,188*
120	Toluene (Toluol)	1,000	3,830	60	300	1,149	*100*	*383*
121	(*o*, *m*, & *p*) Toluidines	40	176	60	10	44	*5*	*22*
122	Vinyl chloride	3,000	7,800	60	1,500	3,900	*500*	*1,300*
123	Xylenes (Xylols)	1,000	4,410	60	300	1,323	*100*	*441*
124	Xylidines	40	200	60	10	50	*5*	*25*
	Dusts, Fumes, and Metals							
125	Antimony (dust or salts) (as Sb)	—	—	—	—	—	—	*0·5*
126	Arsenious oxide	—	—	—	—	—	—	*0·5*
127	Barium salts (as Ba)	—	—	—	—	—	—	*0·5*
128	Benzidine	—	—	—	—	—	—	*0·015*
129	Cadmium	—	—	—	—	—	—	*0·1*
130	Chlorinated diphenyl	—	—	—	—	—	—	*1*
131	Chlorinated naphthalenes	—	—	—	—	—	—	*1*
132	Chromates (as CrO_3)	—	—	—	—	—	—	*0·1*
133	Dinitrocresol (and salts)	—	—	—	—	—	—	*0·5*
134	Dinitrophenol (and salts)	—	—	—	—	—	—	*1*
135	Dinitroresorcinol	—	—	—	—	—	—	*1*
136	Dinitrotoluene	—	—	—	—	—	—	*1·5*
137	" Dowtherm A "	—	—	—	—	—	—	*2*
138	Lead (and salts)	—	—	—	—	—	—	*0·13*
139	Mercury	—	—	—	—	—	—	*0·1*
140	α-Naphthylamine	—	—	—	—	—	—	*0·01*
141	β-Naphthylamine	—	—	—	—	—	—	*0·01*
142	" Parathion "	—	—	—	—	—	—	*1*
143	Pentachlorphenol	—	—	—	—	—	—	*0·5*
144	*p*-Phenylene diamine	—	—	—	—	—	—	*0·1*
145	Phosphorus pentachloride	—	—	—	—	—	—	*1*
146	Potassium permanganate	—	—	—	—	—	—	*5*
147	Sulphuric acid	—	—	—	—	—	—	*1*
148	Sodium cyanide	—	—	—	—	—	—	*5*
149	Tetryl	—	—	—	—	—	—	*1·5*
150	T.N.T.	—	—	—	—	—	—	*2*
151	Zinc oxide	—	—	—	—	—	—	*10*

Concentrations shown in italic are tentative and are issued as a guide. Figures in all columns will be subject to review as more data become available.

*1 mg./cu. metre ≡ 4·37 × 10^{-4} grains/cu. ft.